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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,838	03/12/2004	Randy L. Hoffman	200316548-1	8516

22879 7590 12/13/2005

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EXAMINER

PHAM, LONG

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/799,838

Applicant(s)

HOFFMAN ET AL.

Examiner

Long Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 15-32 and 42-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 33-41 and 57-67 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2 IDS (2 dates).
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

Applicant's election without traverse of claims 1-14, 33-41, and 57-67 in the reply filed on 10/11/05 is acknowledged.

***Claim Objections***

Claim 1 is objected to because of the following informalities: "the gate electrode" should be "a gate electrode". Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14, 33-41, and 57-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasaki et al. (EP 1134881) in combination with Cillessen et al. (WO 97/06554).

With respect to claims 1, 3, 5, 7, 9, 57, 58, 60, 62, 64, and 66, Kawasaki et al. teach a semiconductor device, comprising (see figs. 1-9 and associated text):

A drain electrode 13;

A source electrode 12;

A channel contacting the drain electrode and source electrode (fig. 1B), wherein the channel is made of ZnO; and

A gate dielectric 15 positioned between the gate electrode 14 and the channel (fig. 1A).

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Kawasaki et al. teach the channel layer comprises of ZnO but fail to teach that the channel layer further comprises Ga or In and Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb.

Cillessen et al. teach the presence of Ga or In and Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb and Zn or Cd or Ga or In or Ge or Sn or Pb in metal compound would increase the charge carrier mobility. See page 2, lines 15-35.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the teaching of Cillessen et al. into the device of Kawasaki et al. achieve the above benefit.

With respect to claims 2, 4, 6, 8, 10, 59, 61, 63, 65, and 67, Cillessen et al. fail to teach the ranges for the relative ratios of metals in the compound.

However, since Cillessen et al. teach the presence of these metal would increase the charge carrier mobility of the compound, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value or range for the relative ratios of metals in the compound through routine experimentation and optimization to obtain optimal mobility for the compound because in absence of unexpected result it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claims 11, 13, and 39, Kawasaki et al. in combination with Cillessen et al. appear to fail to teach the channel comprises of an amorphous form or single-phase crystalline form material.

However, the use of amorphous form or single-phase crystalline form material as channel is well-known.

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With respect to claim 12, Kawasaki et al. teach a semiconductor device, comprising (see figs. 1-9 and associated text):

A drain electrode 13;

A source electrode 12;

Means for a channel to electrically couple the drain electrode and source electrode; and

A gate electrode 14 separated from the channel by a gate dielectric 15.

With respect to claims 14 and 39, Kawasaki et al. further teach that the source, drain, and gate electrodes include a substantially transparent material. See the abstract.

With respect to claims 33-38 and 40-41, Kawasaki et al. in combination with Cillessen et al. teach the recited device.

Further respect to claims 33-38 and 40-41, how the device is formed has not been given patentability weight because the invention is directed to a device.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Long Pham

Primary Examiner

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LP